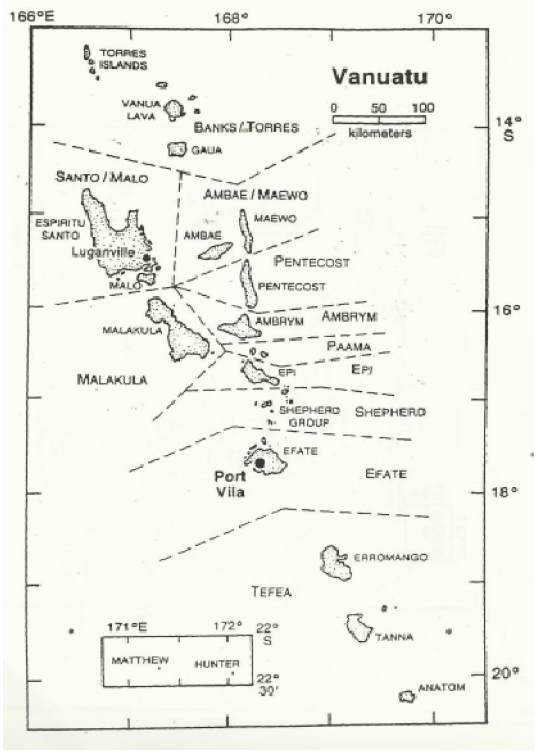
Vanuatu Trip Report – Pacific Breadfruit Project



Report	Vanuatu Trip Report
date	10th March – 15th March
prepared by	KaituErasito, Technical Breadfruit Officer, Pacific Breadfruit Project.

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1 Introduction

This report was prepared by KaituErasito (Technical Officer) of the Pacific Breadfruit Project(PBP).

Vanuatu has a wide diversity of breadfruit varieties whichare found on eight islands within the archipelago.The purpose of this trip was three folds:

- To visit the national breadfruit collection held at the Vanuatu Agricultural Research and Technical Centre (VARTC) in Santo and to survey the breadfruit varietiesin Malo Island.
- To get familiarized withthe characterisation work that had been undertaken withthe Vanuatu national collection and to compare it with the PBP work undertaken with breadfruit varieties in Fiji.
- To explore opportunities for collaborative applied breadfruit research between Fiji and Vanuatu.

Consultations were held with Dr.Vincent Lebot, the Principal Research Officer(PRO) at Tagabe Research Station about the breadfruit diversity in Vanuatu and following up the characterisation work that had been conducted on the breadfruit orchards located at VARTC inSanto and in a private farmer orchardon Malo Island. Discussions were held with the Farmer Support Association(FSA), Vanuatu long standing farmer's network. FSA particular focus is on commercial sustainable agriculture. FSA has a particular interest in sustainable commercial small holder agriculture. FSA is keento introduce marcottingtechniques to its members. Thus a demonstration of breadfruit marcotting was providedto FSA.

The Lapita Caféin the past few years has been processing staples such as cassava, kumala, taro and breadfruit into flour and other products. Sustainable supply is proving a major constraint. Thus the LapitaCafé ownerVotausi Mackenzie-Reur is very interested in PBP's breadfruit orchard development work. .

The PBP would like to express its appreciation to our colleagues in Vanuatu who made this short visit such a success. In particular thanks go to Dr Vincent Lebot (Vanuatu Dept of Agriculture), Dr Roger Malapa and MarieMelteras (VARTC), Charles Rogers (FSA)and Mrs VotausiMackenzie –Reur (Lapita Cafe)

2 Objectives

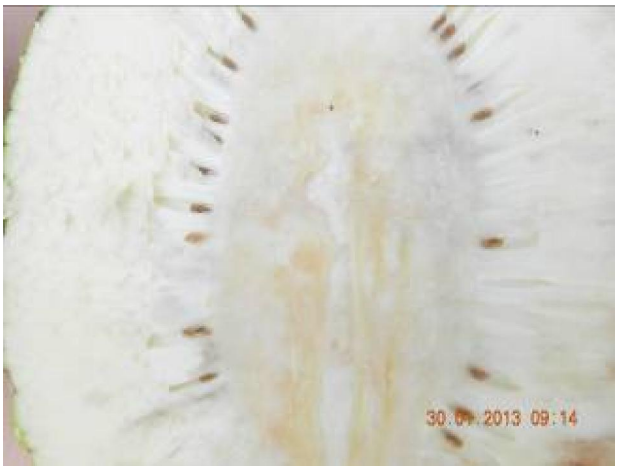
The objectives of the PBP's visit to Vanuatu wereto;

1. Conduct in-depth investigation on the characterization methodology used in the Vanuatu breadfruit work.
2. Visit germplasm collection at various research stations.
3. Compare and document current husbandry practices.
4. Document breadfruit diversity and compare with our local varieties.
5. Compare fruiting patterns with those of the Fiji varieties.
6. Investigate existing breadfruit trials and develop it intoPBP work in Fiji.
7. To meet with Votausi Mackenzie-Reur of Lapita Café Ltd to discuss breadfruit processing development.
8. To discuss opportunities for future collaboration between Fiji and Vanuatu in breadfruit research and industry development.

3 Tagabe Research Station: Discussions with Dr Vincent Lebot

The headquarters of Vanuatu Agriculture Department is located at the Tagabe Research Station outside Port Vila.The ResearchDepartment, utilizing the services of French Masters student and under the supervision of Dr Vincent Lebot, has recently completed a catalogue of breadfruit varieties[1] in Vanuatu.Most of these breadfruit varieties that were collected are planted at VARTC in Santo Island with accession number and names of the Island from which they were collected. The PBP has made extensive use of this publication and to be able to meet and discuss this work with Dr Lebot and to see the collection first hand was invaluable for the PBP.

An important lesson learnt from the discussions with Dr Lebotis in determining the difference between sterile and non-sterile seeds. Thus those breadfruits with abundant small sterile seeds are in effect the same as the seedless varieties that were identified at Natewa Village in Cakaudroveprovince,VanuaLevu[2]. A lack of understanding of this relationship has been to date a major drawback in the characterisation work in Fiji.The pictures below show a classification of seeded and seedless varieties of breadfruit.

	
Seedless (those small seeds are sterile which cannot produce a new tree).	Seeded variety with abundant seed (1 or 2 seeds can produce new tree).

[1]Vanuatu Breadfruit project (2004-2005) Navarro.M, Labouisse.J.P, Malres. S, Ragone.D,Roupsard.O

[2]Vanua Levu Trip report (2012) Pacific Breadfruit project. Tora.L&Erasito .K

Prior to this trip the project had established that the 19 of the 20 varieties characterised composed of sparse seeds.After careful consultation of the samples by Vincent Lebot it was established that the seeds were sterile seeds(not viable).However it is still unclear whether this has any effect on the shelf life of the breadfruit

Another key piece of information raised from discussion with Dr. Vincent was that breadfruit can also cross pollinate. A male pollen of a different variety can cross pollinate with a female gamete of another variety which produces an offspring that can show different characteristics to the parents(the offspring being a different variety altogether).

Some possible examples of this in Fiji are varieties derived from the Uto Dina variety. These may include: example is the Uto Dina variety we have in Fiji.[3]

- Uto Dina KasaLeka
- Uto Dina KasaBalavu
- Balekana Dina
- Uto Dina (Large variety)
- Uto Dina ni Samoa
- Uto Dina with yellow flesh
- Uto Dina with white flesh.

There is a need todo a very thorough survey on the traditional knowledge related to the morphological characteristic and use of these varietieswith reference to the database on their geographical origin in order to identify the potential parents of all these varieties above with economic potential.

[3]Koroiveibau. D (1967)

4 Farm Support Association(FSA)

Farm Support Association was established in 1983. FSA operates a farmer's network – with an emphasis on sustainable commercial activities for small holders. FSA activities in recent years have focussed on a Spices Network and support for the vegetable sector. Support for the vegetable sector two key areas:

- Vegetable seedling production; and
- On-farm vegetable production using improved varieties and improved production practices.

The Association has also been involved in introducing the Tutu Rural Training Centre model to most rural training centres in Vanuatu. Farmers in the institute are encouraged to grow peanuts and vegetables more, for there is a high demand in local hotels and markets.

FSAcontinue to train village farmers on practical farming FSA were interested in the marcotting trial that the(PBP) conducted at the LegalegaResearch Station (LRS) and Sigatoka Research Station (SRS).

A time was allocated for practical sessions on marcotting and potting of rootsuckers with the FSA collaborators.

	
Charles Rogers with Vincent Lebot on root sucker propagation at La Source Farm.	Marcotting techniques being demonstrated

	
Charles Rogers and La Source plantation staff potting root suckers	Newly propagated root suckers.

5 Vanuatu Agricultural Research and Training Centre (VARTC), Santo Island.

This is the home of the123 accessions of breadfruit trees that was collected from the 8 islands of Vanuatu.

- 1st collection had 48 accessions - planted in 1995
- 2nd collection had 75 accessions – planted in 2007
- The breadfruit trees were planted and arranged in the field according to its island of origin for easy referencing.
- The spacing that were used is 7m x 7m

	
The 1st collection of breadfruit at VARTC planted in 1995.	The 2nd collection of breadfruit at VARTC planted in 2005.

Observational trials revealed that the "root sucker" propagated trees started to bear fruit in year 5. [4]

[4]Source: Dr Roger Malapa. Senior Scientist (VARTC)

	
A five year old tree bearing fruit at VARTC	A close up photo of the bearing tree

According to the fruiting calendar ofthe breadfruit collection at the station, most breadfruit is off season at the moment(January – March)whilst some have developed young fruits.[5]

5.1 Inter- cropping

Intercropping observational trials were conducted at the station and traditional crops were being in cooperated along the breadfruit orchards. The following crops are currently being used.

- Yams
- Kumala
- Cassava
- Navia

[5]Refer to Page 13 for Fruiting Vanuatu fruiting calendar.

	
Inter-cropping withnavia (*Alocasiamacrorrhiza)*	Inter-cropping with cassava(*Manihotesculenta*)

Dataiscollected on a monthly basis. An interestingobservation on the effects of ploughing on the growth of breadfruit trees have been documented. Observational trials conducted involved the effects of:

- Ploughing2 times within breadfruit spacing
- Ploughing 1 time within breadfruit spacing
- No ploughing done within breadfruit spacing
- Preliminary observations indicated a difference in the growth rate at the three different sites[6].

	
The breadfruit site which was ploughed twice between rows	The breadfruit site which has never been ploughed between the rows.

[6]Source: Dr Roger Malapa (VARTC)

6 Problems faced by the breadfruit orchards:

In an orchard style system trees are prone to insect infestation. VATRC indicated a few issues that have been observed in their orchards. Research is being conducted to identify the pest.

6.1 Borer Insect

- *Borer insect* – which bores its way and lay eggs inside the branches of breadfruit trees and later cause death of branch

	
Indication of borer insects	Larvae of insect borer inside terminal bud

6.2 Breadfruit pruning

Marcotts were conducted at VARTC to demonstrate the different propagation techniques. It was also a chance to prune the branches of some breadfruit trees.

	
VARTC staff demonstrate marcotting	World Bank official (Ruffino) at work

6.3 Characterisation work

Mrs. Mackenzie (middle) with Dr.RogerMalapa and Kaitu at Santo

TheVanuatu fruiting calendar indicatedthat trees were bearing fruit in early April and maturing around July. The VARTC team use the breadfruit descriptors implemented by the National Tropical Botanical Garden (NTBG)[7]. The same practices are being adopted by the PBP.

Below is the Vanuatu breadfruit fruiting calendar.

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec

[7]Ragone.D. (1993) National Tropical Botanical Garden (NTBG) Breadfruit descriptors.

7 Lapita Café

The entrance to Lapita Cafe

The Port Vila Lapita Café is well known for specialising in Vanuatu local food, processing a wide range of root crops such as cassava, kumala, taro etc. The company has also manufactured breadfruit flour and has produced high quality products. However,according to the Lapita CaféVotausi Mackenzie – Reur, continuity supply has been a major drawback tocommercially viable production of breadfruit flour production. Thus the Lapita Café is keen to promote breadfruit orchards to overcome this constraint.

The company is in the process of moving to Santo to overcome supply constraints. There is a lot more farming done in Santo than in Port Vila. Most root crops are harvested weekly from different villages around the island and are sold to local markets. Mrs Mackenzie – Reur believes the orchards in VARTC and the island of Malo would be enough to supply the company with breadfruit for at the least for the first few years of operation

8 Malo Island – a hot spot of breadfruit diversity

A total collection of 123 breadfruit trees are establishedat VARTC.Malo Island contributed to some of the collections.

On our way to Malo Island, with Malo Extension Officer Bakonand CaptainRosse

A 35 year old breadfruit tree located inside a village on Malo Island.

Long bamboo used for harvesting breadfruit

One of the 12 varieties that only had a few or without lobes.

9 Conclusions

The Vanuatu trip proved very valuable. The technical exchange with breadfruit experts from the various organisations and research stations broadened the PBP's knowledge on existing work on breadfruit at regional level.

More collaboration with our Vanuatu counterparts is recommended to move this industry in the right direction. The visit has identified some good lessons that PBP can learn from.

Lapita Café has been a great resource and further collaboration on the processing component is being developed.

The experience and information shared by VinacentLebot, Charles Rogers, Roger Malapa and Mrs McKenzie is appreciated.